

CLAIMS:

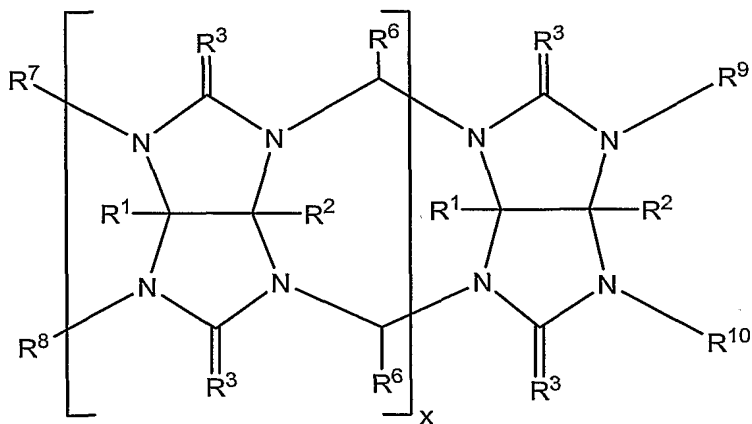
1. A method for preparing a compound comprising a plurality of cucurbituril groups, the method comprising
 5 the steps of:

(a) forming a mixture comprising one or more compounds of the formula (1)

10 A-L-A (1)

wherein:

L is a linking group; and
 15 each A is independently selected and is a group of the formula (A)



(A)

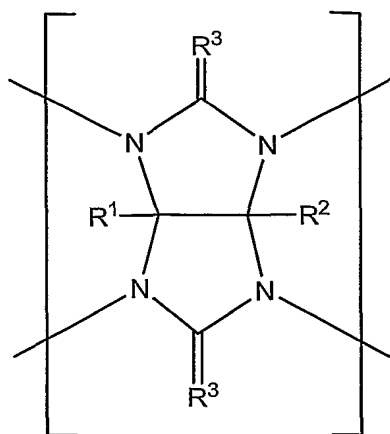
20

wherein:

for each unit of the formula (B)

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(B)

in formula (A),

5 R^1 and R^2 may be the same or different, and are each independently selected from a bond with L or a univalent radical, or R^1 , R^2 and the carbon atoms to which they are bound together form an optionally substituted cyclic group, or

10 R^1 of one unit of the formula (B) and R^2 of an adjacent unit of the formula (B) together form a bond or a divalent radical, and

15 each R^3 is independently selected from the group consisting of $=O$, $=S$, $=NR'$, $=CXZ$, $=CZR'$, $=CXR''$ and $=CZ_2$, wherein Z is an electron withdrawing group, X is halo, and R' is selected from the group consisting of a bond with L, H, an optionally substituted straight

20 chain, branched or cyclic, saturated or unsaturated hydrocarbon radical, or an optionally substituted heterocyclyl radical, and R'' is a bond with L;

each R^6 is independently selected from the group consisting

25 of a bond with L, H, alkyl and aryl;

R^7 and R^8 may be the same or different and are

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independently selected from the group consisting of H and $-\text{CHR}^6\text{OR}^6$, or R^7 and R^8 together form the group $-\text{CHR}^6-\text{O}-\text{CHR}^6-$, where each R^6 is independently selected from the group consisting of a bond with L, H, alkyl and aryl;

5

R^9 and R^{10} may be the same or different and are independently selected from the group consisting of H and $-\text{CHR}^6\text{OR}^6$, or R^9 and R^{10} together form the group $-\text{CHR}^6-\text{O}-\text{CHR}^6-$, where each R^6 is independently selected from the group

10

consisting of a bond with L, H, alkyl and aryl; and

x is 0 or an integer from 1 to 10;

provided that at least one R^1 , R^2 or R^6 is a bond with L or at least one R^3 is $=\text{NR}''$, $=\text{CZR}''$ or $=\text{CXR}''$ where R'' is a bond

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with L; and

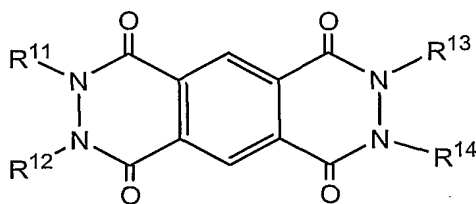
an acid; and

(b) exposing the mixture to conditions effective for at least some of the groups A to react to form cucurbituril groups, thereby forming a compound comprising a plurality of cucurbituril groups.

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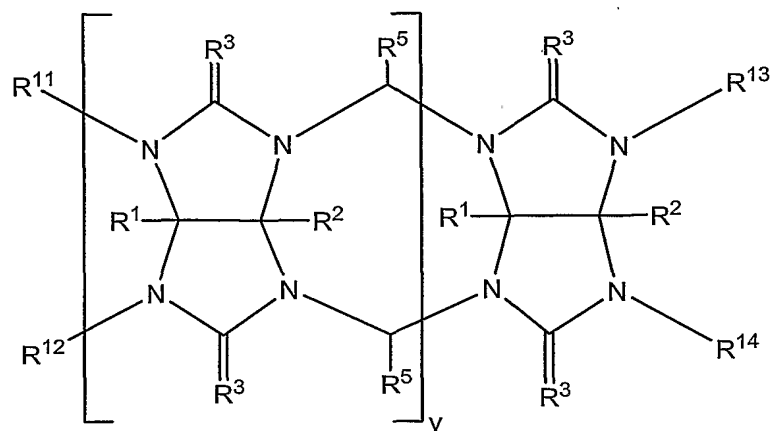
2. A method according to claim 1, wherein the mixture further comprises one or more compounds selected from compounds of the formula (6):

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(6)

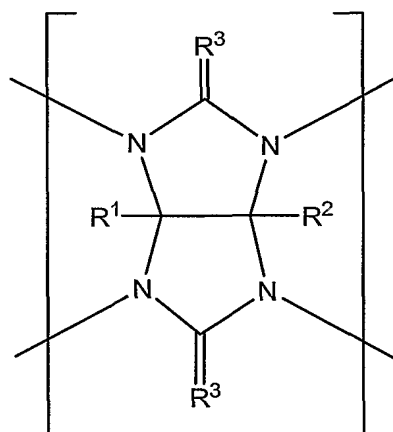
and compounds of the formula (2):



(2)

wherein:

for each unit of the formula (B):



(B)

in the compound of formula (2),

R^1 and R^2 may be the same or different, and

10 are each a univalent radical, or

R^1 , R^2 and the carbon atoms to which they are bound

together form an optionally substituted cyclic group, or

R^1 of one unit of the formula (B) and R^2 of an adjacent

unit of the formula (B) together form a bond or a divalent

15 radical,

and

each R^3 is independently selected from the group consisting

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of =O, =S, =NR, =CXZ, =CRZ or =CZ₂, wherein Z is an electron withdrawing group, X is halo, and R is H, an optionally substituted straight chain, branched or cyclic, saturated or unsaturated hydrocarbon radical, or an
5 optionally substituted heterocyclyl radical;

each R⁵ in formula (2) is independently selected from the group consisting of H, alkyl and aryl;

10 R¹¹ and R¹² may be the same or different and are independently selected from the group consisting of H and -CHR⁵OR⁵, or R¹¹ and R¹² together form the group -CHR⁵-O-CHR⁵-, where each R⁵ is independently selected and is as defined above,

15 R¹³ and R¹⁴ may be the same or different and are independently selected from the group consisting of H and -CHR⁵OR⁵, or R¹³ and R¹⁴ together form the group -CHR⁵-O-CHR⁵-, where each R⁵ is independently selected and is as
20 defined as above; and

y is 0 or an integer from 1 to 9;

and wherein at least some of the cucurbituril groups
25 formed are formed from a group A of one molecule of the formula (1), a group A of at least one other molecule of the formula (1) and one or more molecules of formula (2) or (6).

30 3. A method according to claim 1 or 2, wherein step (b) comprises heating the mixture to a temperature from 20°C to 120°C.

4. A method according to claim 1 or 2, wherein step (b)
35 further comprises contacting the one or more compounds of the formula (1) with a compound that can form bridges between groups A, and between a group A and a compound of

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formula (2) or (6), and heating the mixture to a temperature from 20°C to 120°

5. A method according to claim 4, wherein the compound
5 that can form bridges between groups A, and between a group A and compound of formula (2) or (6), is selected from the group consisting of compounds of the formula R^5COR^5 wherein each R^5 is independently selected from the group consisting of H, alkyl and aryl, compounds of the
10 formula $R^5OC(R^5)_2OR^5$ wherein each R^5 is independently selected from the group consisting of H, alkyl and aryl, trioxane, optionally substituted 3,4-dihydropyran and optionally substituted 2,3-dihydrofuran.
- 15 6. A method according to claim 4, wherein the compound that can form bridges between groups A, and between a group A and compound of formula (2) or (6), is formaldehyde.
- 20 7. A method according to any one of claims 1 to 6, wherein R^3 is O and R^6 is H.
8. A method according to any one of claims 1 to 7 wherein L is a polymer.
- 25 9. A method according to any one of claims 1 to 7 wherein L is a group of the formula
 $-(CR_2)_a-(E-(CR_2)_b)_c(CR_2)_d-$ or $-(CR_2)_a-(E-(CR=CR)_b)_c(CR_2)_d-$
wherein:
30 E is -O-, -NR-, -S-, a saturated or unsaturated divalent hydrocarbon radical, or an optionally substituted aliphatic or aromatic divalent heterocyclyl radical;
R is H, an optionally substituted straight chain, branched or cyclic, saturated or unsaturated hydrocarbon radical or
35 an optionally substituted heterocyclyl radical; and
a, b, c and d are each 0 or an integer from 1 to 30;
provided that not all of a, b, c and d are 0.

10. A method according to any one of claims 1 to 7
wherein L is $-(\text{CH}_2)_n-$, $-(\text{CH}=\text{CH})_n-$, $-\text{O}-$, $-\text{NH}-$,
 $-\text{CH}_2-\text{NH}-$, $-\text{CH}(\text{CH}_3)(\text{CH}_2)_n\text{CH}(\text{CH}_3)-$ or
5 $-(\text{CH}_2)_n-\text{N}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)-(\text{CH}_2)_p-$,
where n and p are an integer.
11. A compound comprising a plurality of cucurbituril
groups produced by the method of any one of claims 1 to
10 10.